

Ground-Water Management in Central Maui

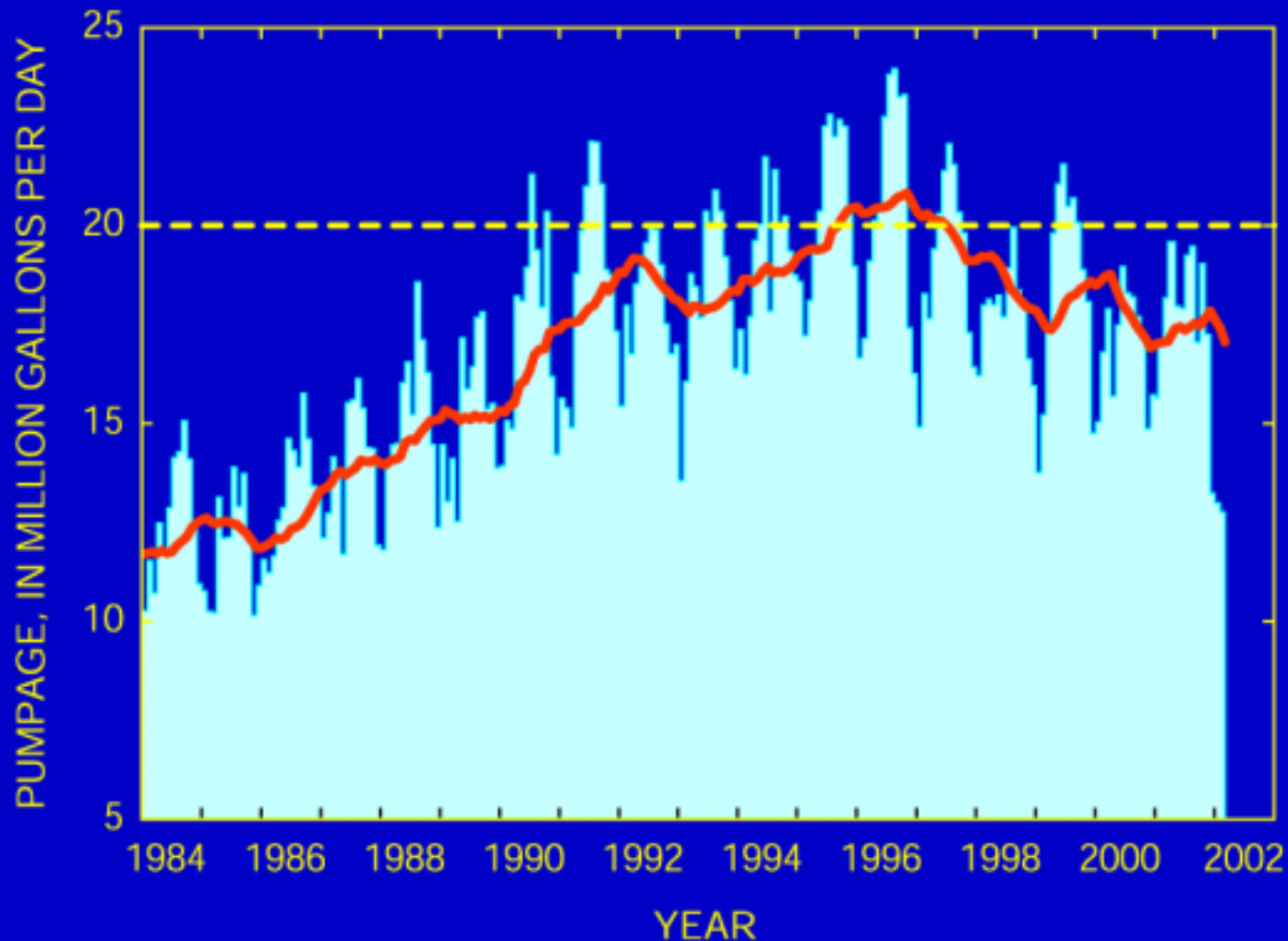
May 2002



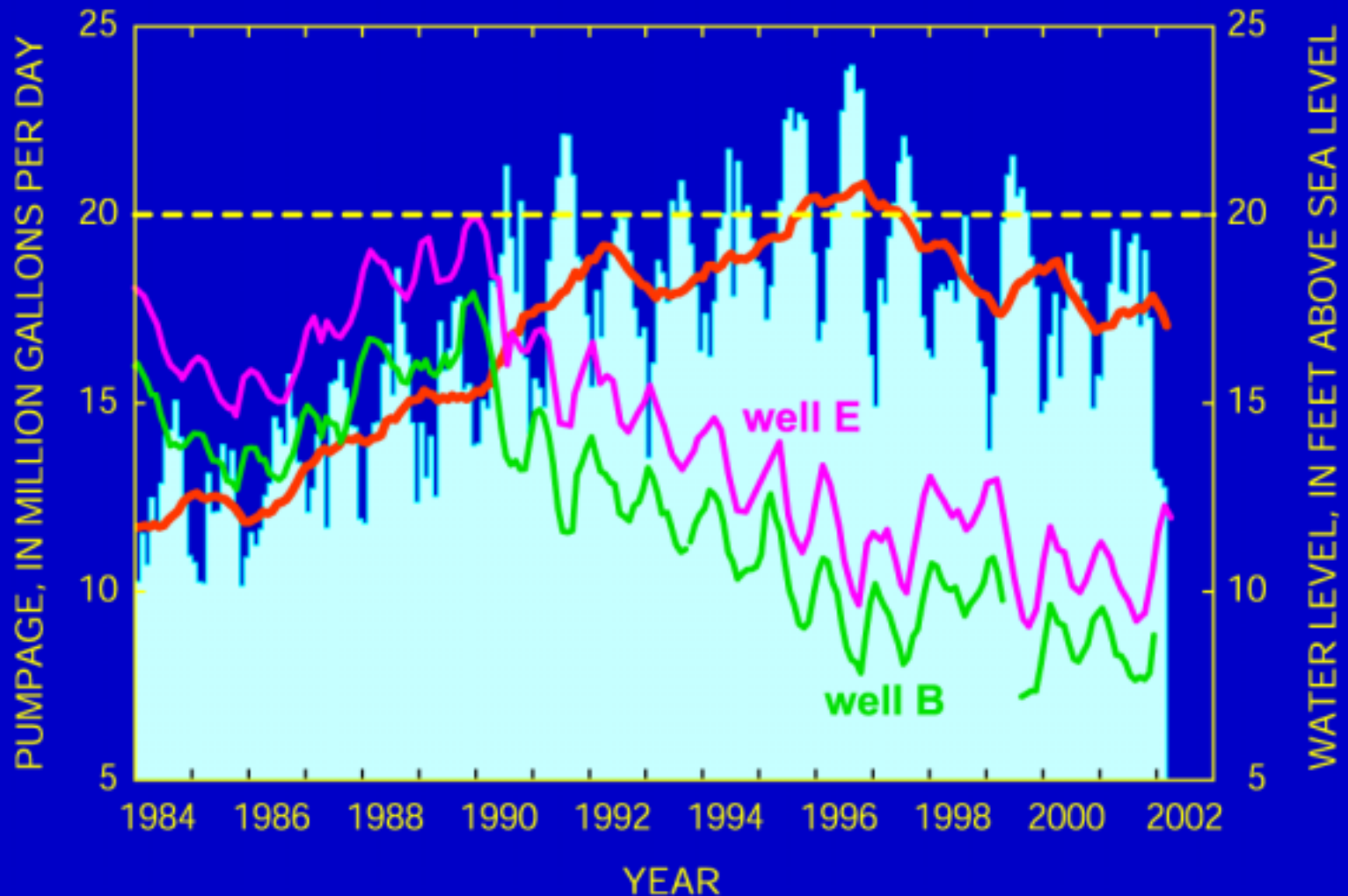
Management Issues

- Can existing withdrawals be sustained?
- What is the maximum yield from existing wells?
- How can additional ground water be best developed?

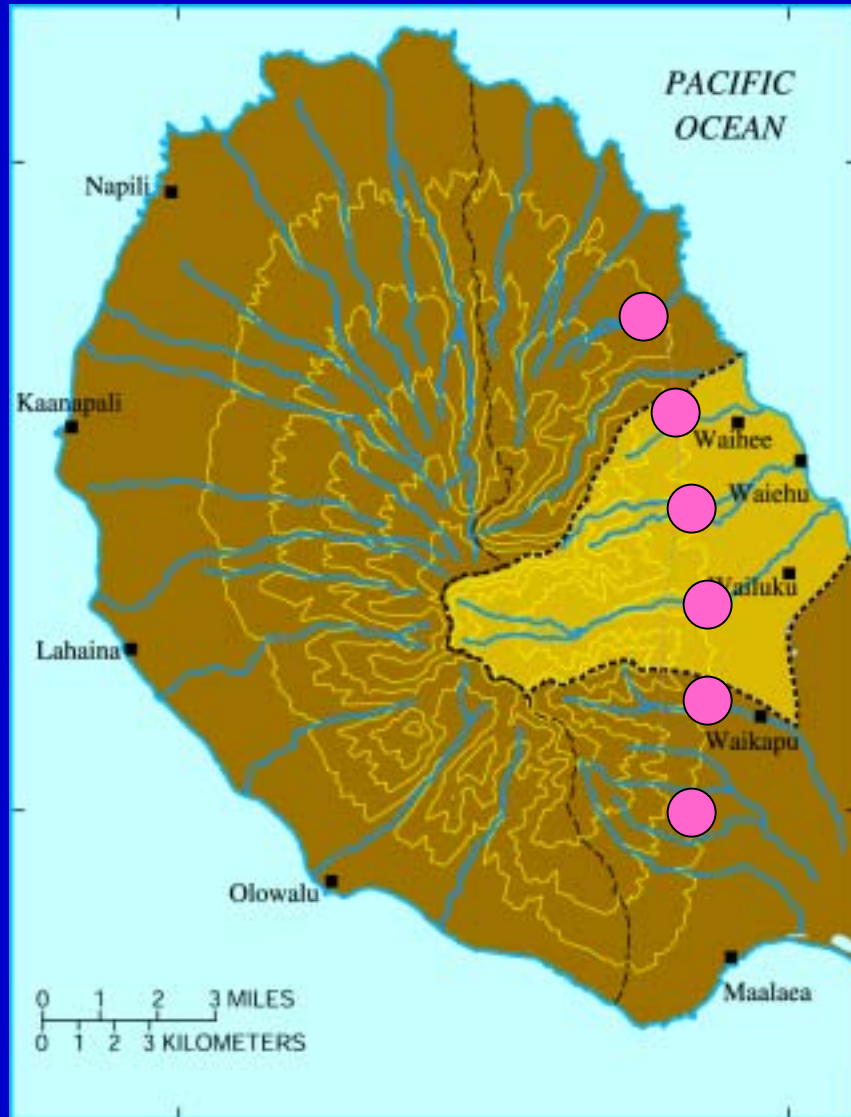
Can existing withdrawals be sustained?



Can existing withdrawals be sustained?



How can additional ground water be best developed?

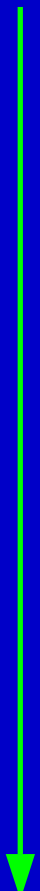


Example of
possible
well sites

Levels of Management

- Monitor salinity at pumped well
- Monitor water levels or salinity in observation wells
- Analytical model
- Numerical model

Cost



Ease of use



Predictive value



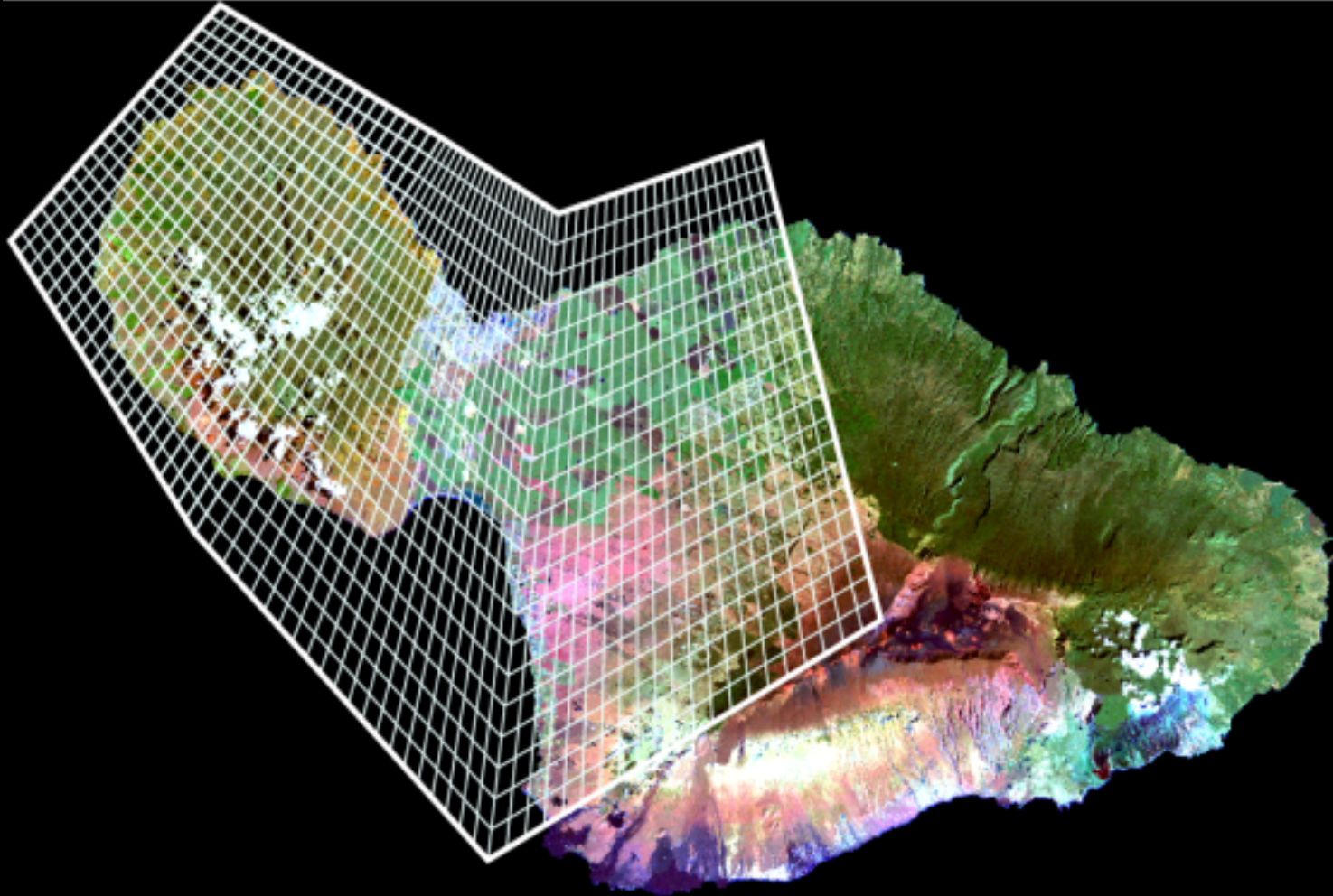
Questions that can be resolved with a numerical ground-water model:

- Can existing wells yield 20 Mgal/d in lao?
- Where should new wells be drilled?
- What if sugarcane cultivation stops?
- What happens during droughts?

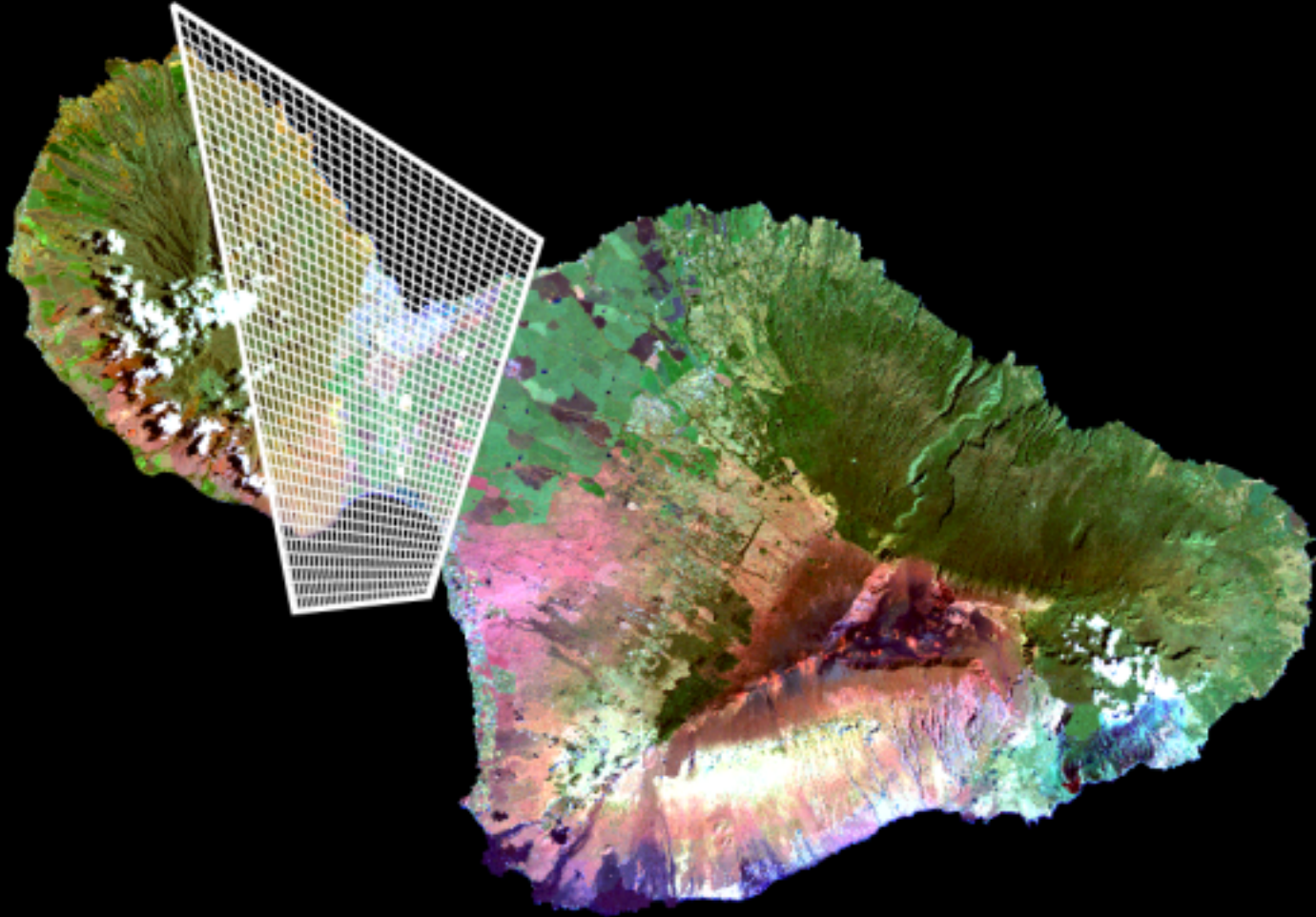
Numerical Ground-Water Model

- Mathematical representation of a ground-water system
- Best tool for understanding a system
- Predictive management approach

Regional Model



Refined Model



Development of a Numerical Ground-Water Model

1. Compile/analyze existing data
2. Collect new data
3. Compute water budget
4. Construct regional model
5. Construct refined model

What Limits Numerical Ground-Water Models?

- Understanding of conceptual framework
- Data

Data Needs

Need

Purpose

climate

recharge

streamflow

ground-water discharge

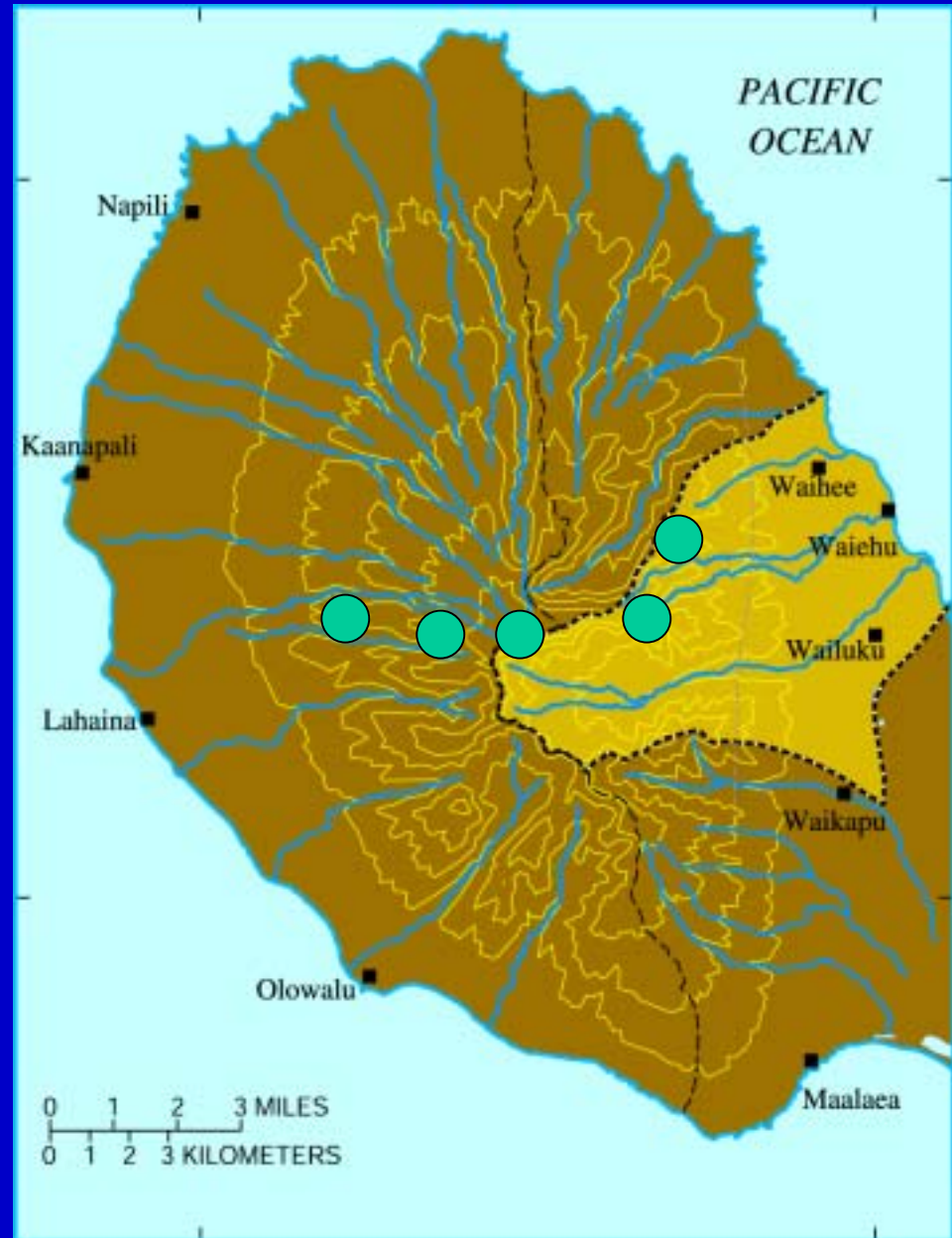
water levels,
salinity, pumping

aquifer properties and
connection between areas

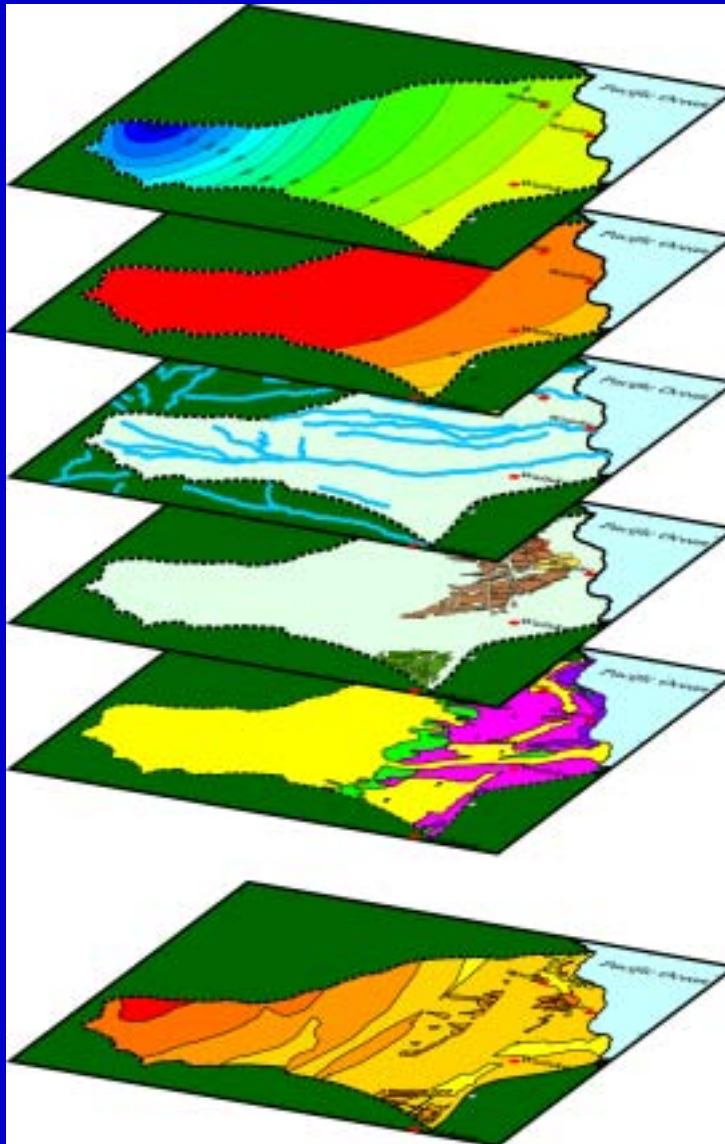
exploratory wells

hydrogeologic

Possible Sites for Weather Stations



GIS Water Budget



Rainfall+Fog Drip

Evaporation

Runoff

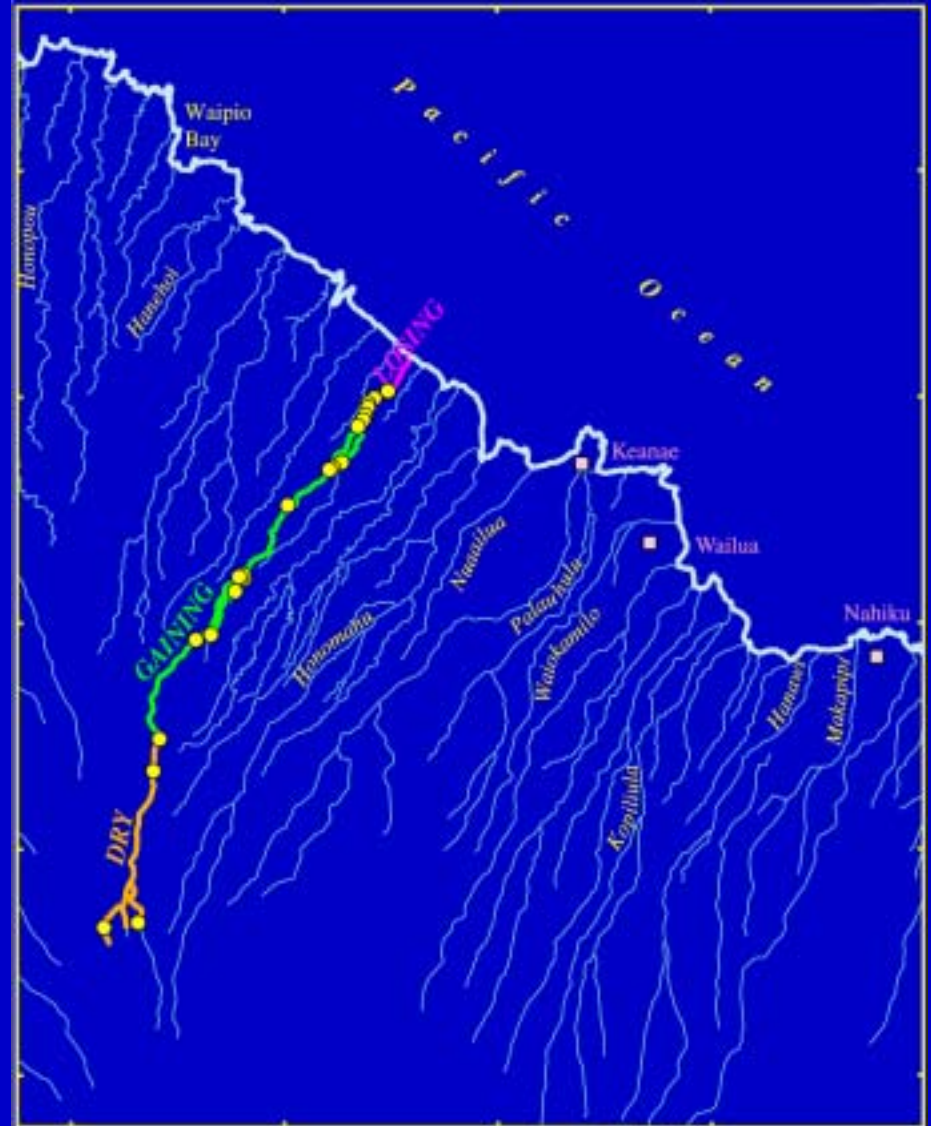
Land cover

Soils



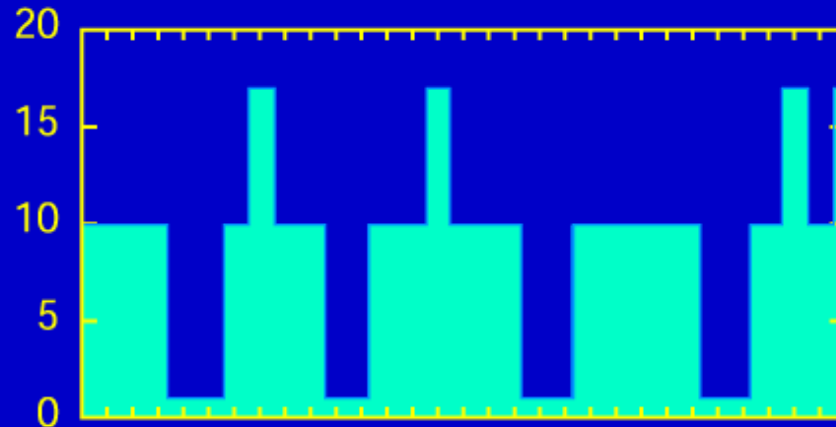
Recharge

Quantify Ground-Water Discharge to Streams



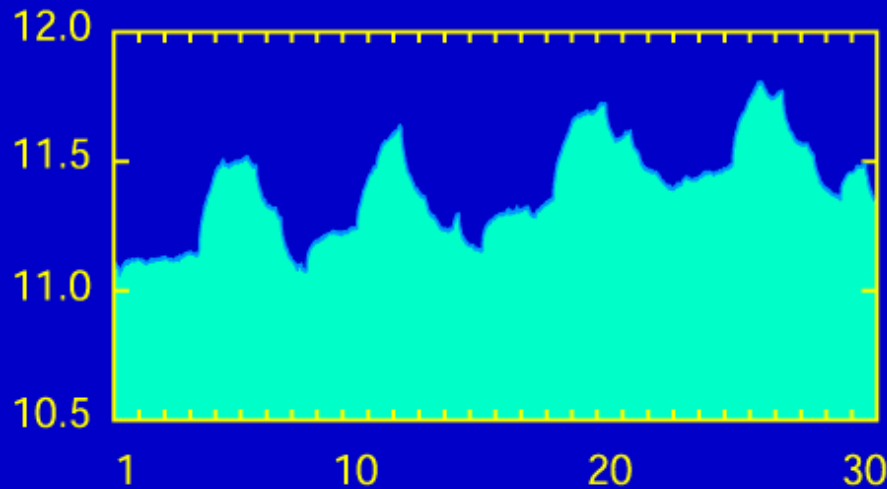
Ground-Water Monitoring

PUMPAGE, IN MILLION
GALLONS PER DAY



Pumpage

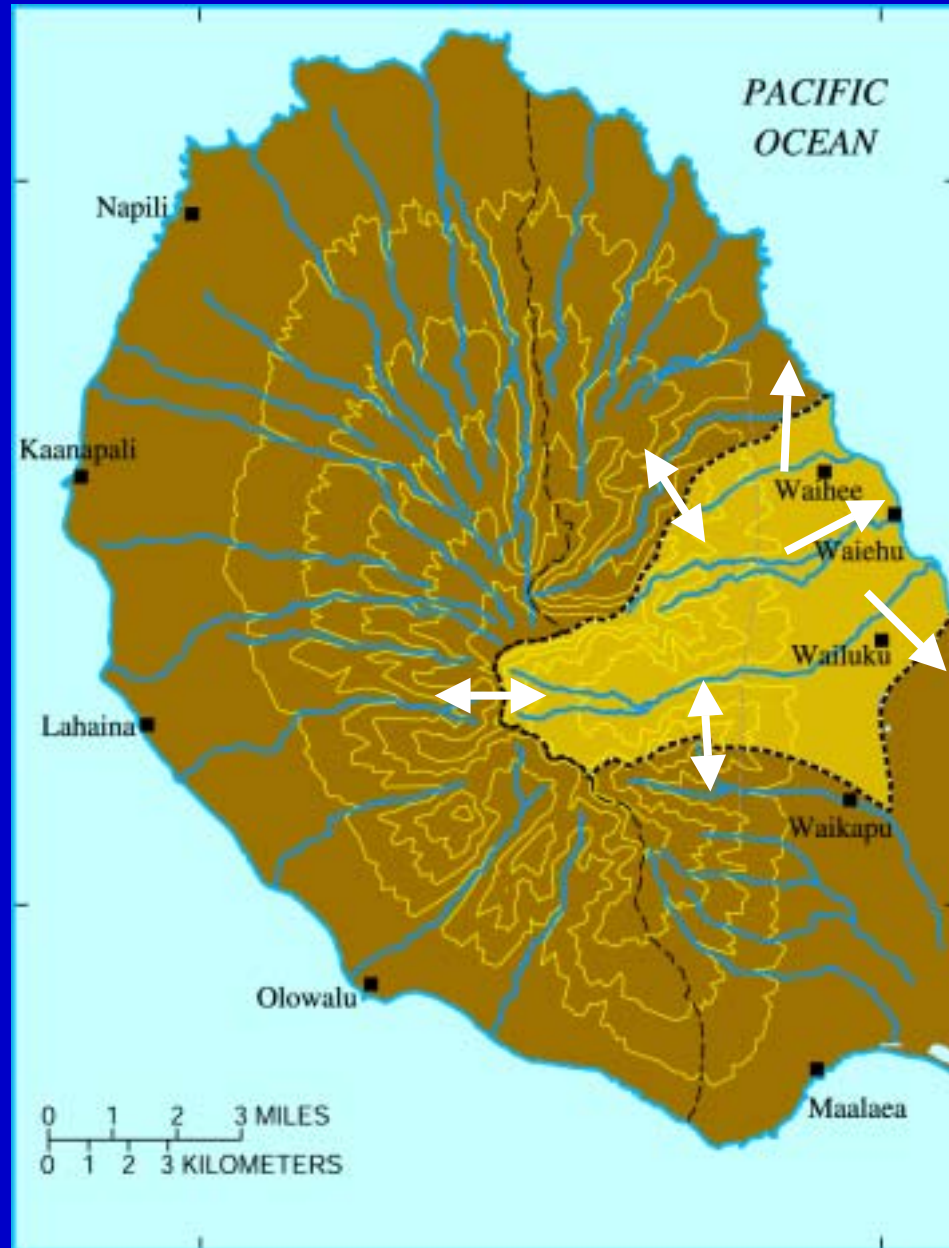
WATER LEVEL, IN
FEET ABOVE SEA LEVEL



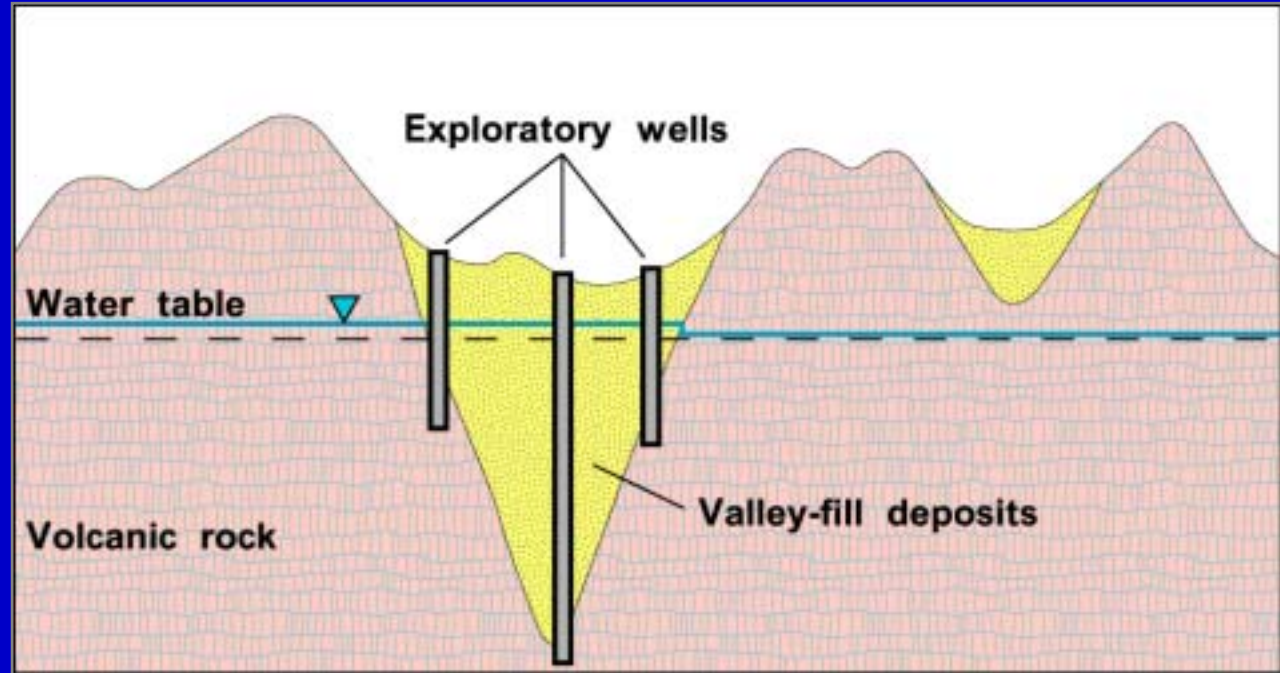
**Water
Levels**

September 1994

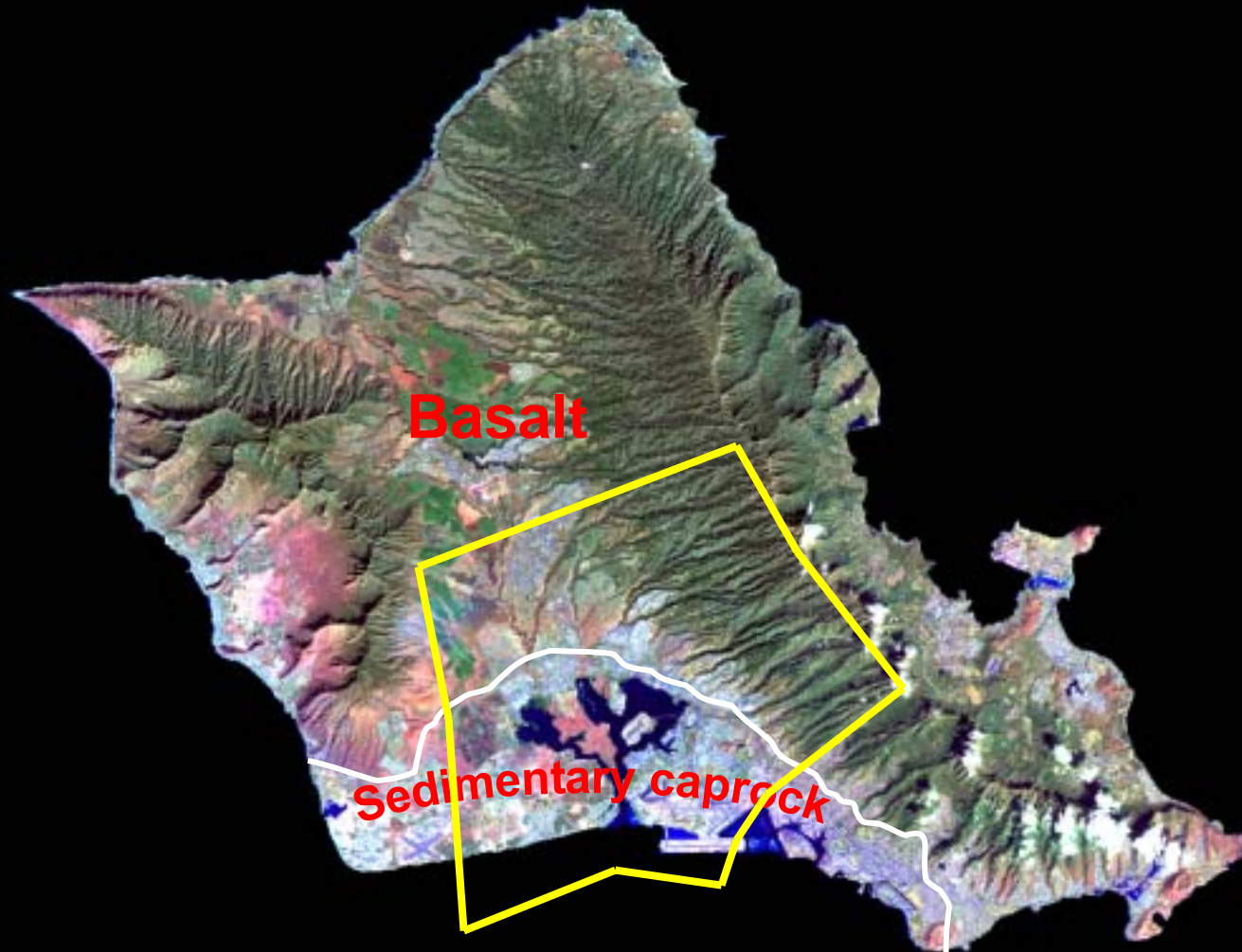
Flow Between Areas



Exploratory Drilling

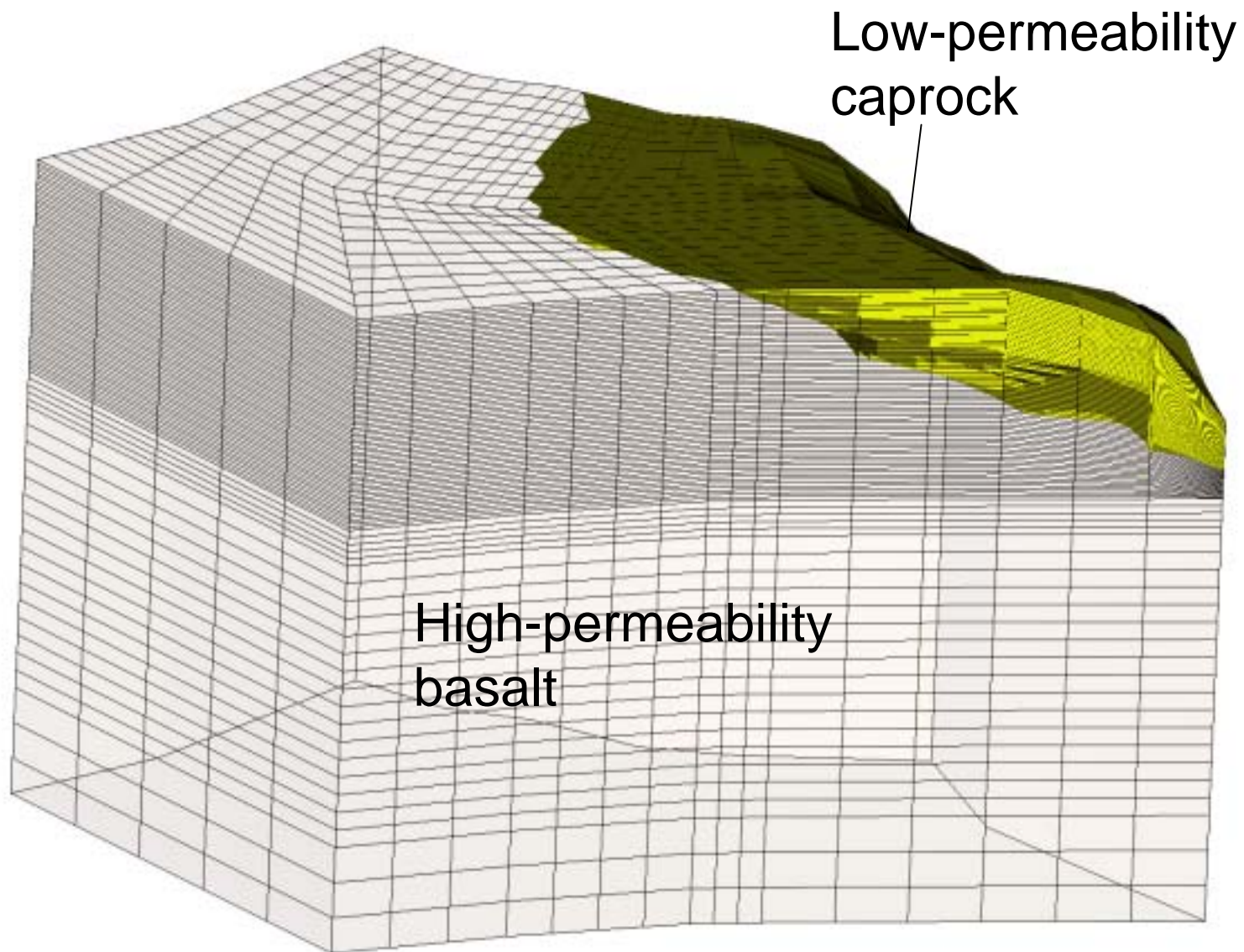


Pearl Harbor 3-D Model



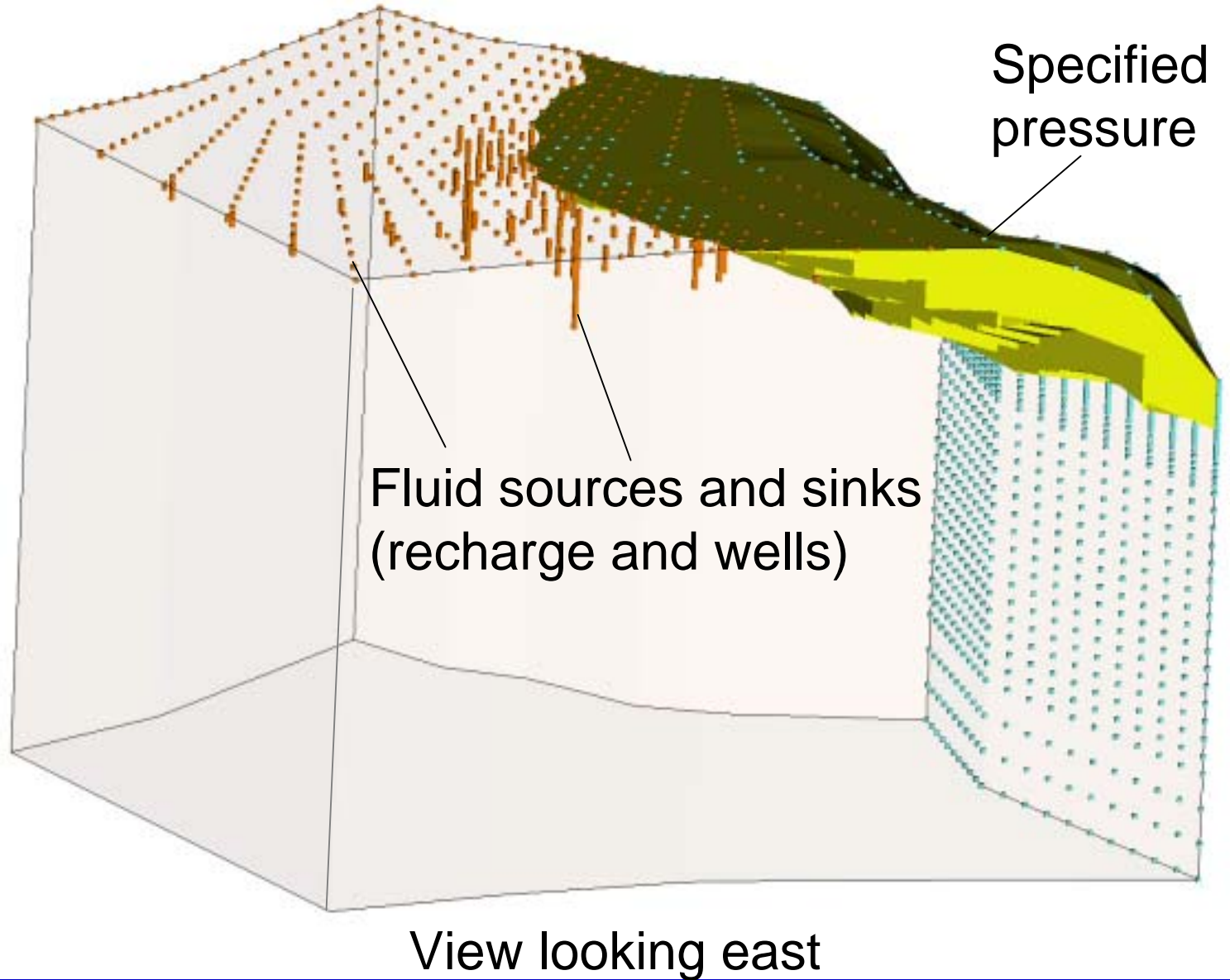
Pearl Harbor Aquifer Area

Model Mesh

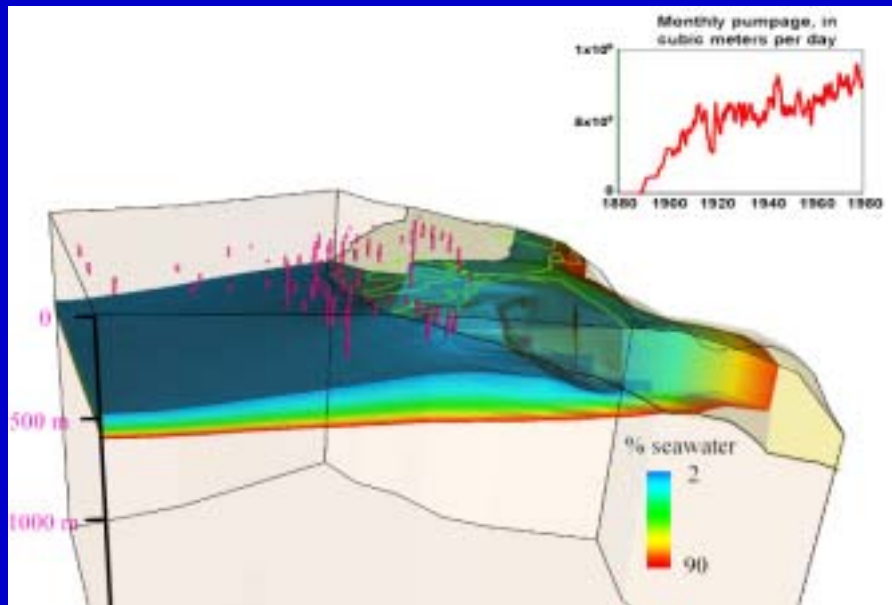


View looking east

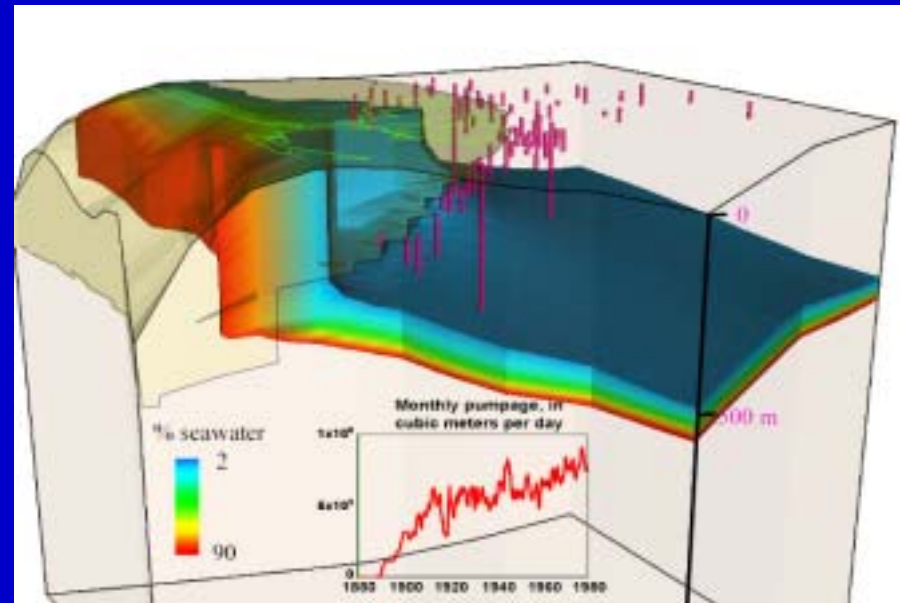
Model Views



Simulation of Withdrawals, 1880-1980



View looking east



View looking west

